Dune Restoration Trust of New Zealand

National Conference, 2013

Nelson – A Region of Coastal Diversity

Conference Presentation: Tasman Bay currents, nutrient/sediment inputs and fisheries

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DUNE RESTORATION TRUST OF NEW ZEALAND

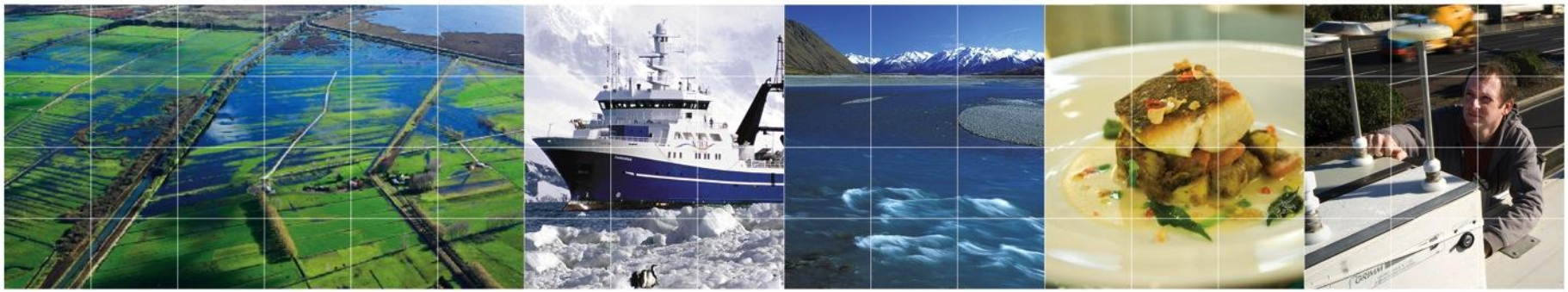
www.dunestrust.org.nz

Tasman Bay currents, nutrient/sediment inputs, fisheries

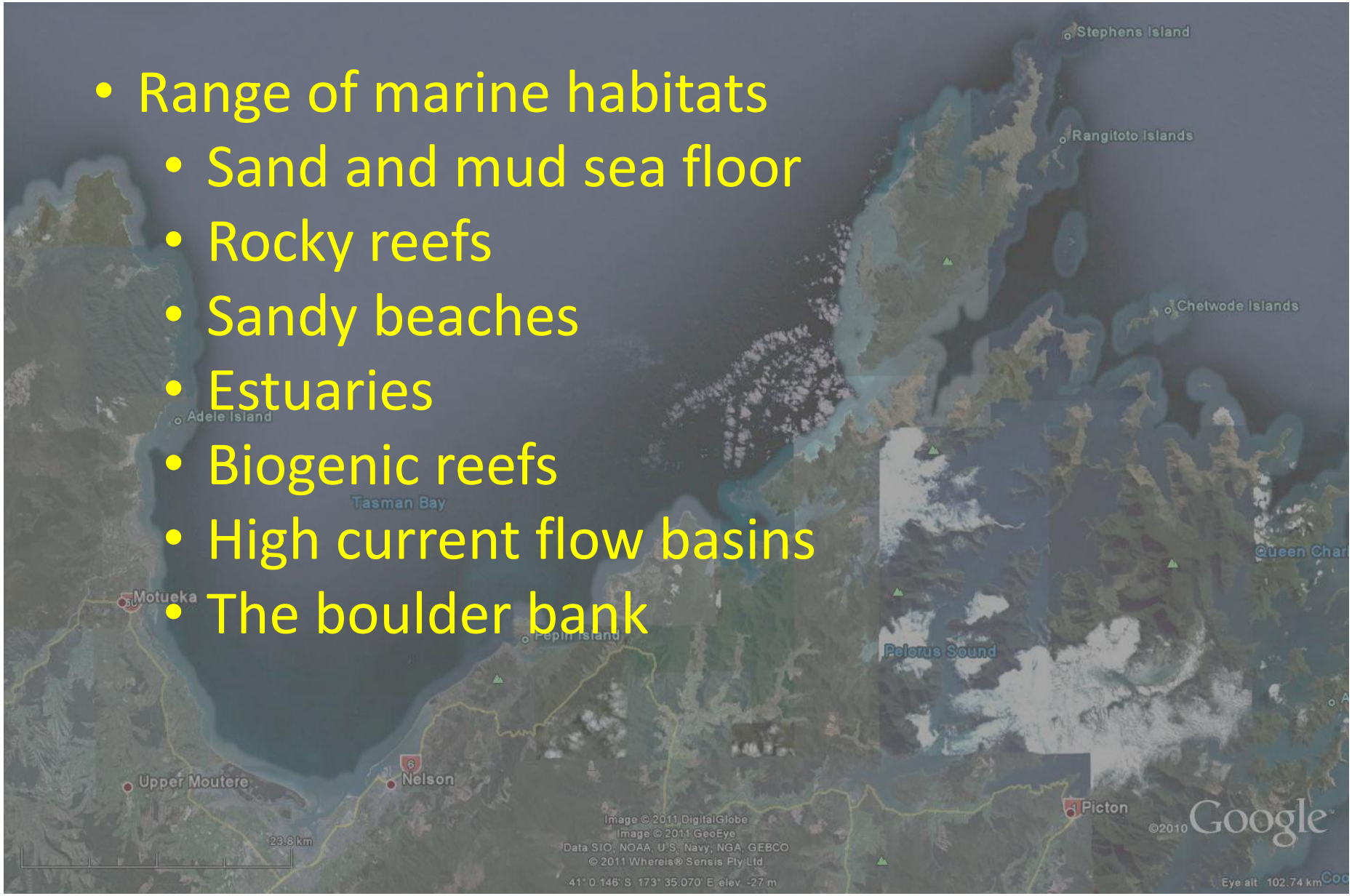
Ken Grange

NIWA Nelson

Presentation to Dunes Restoration Trust Conference 2013

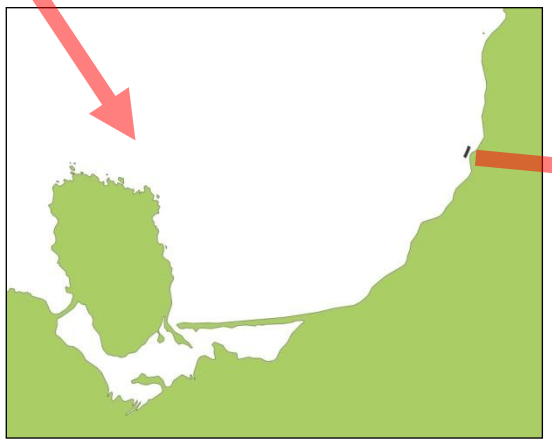


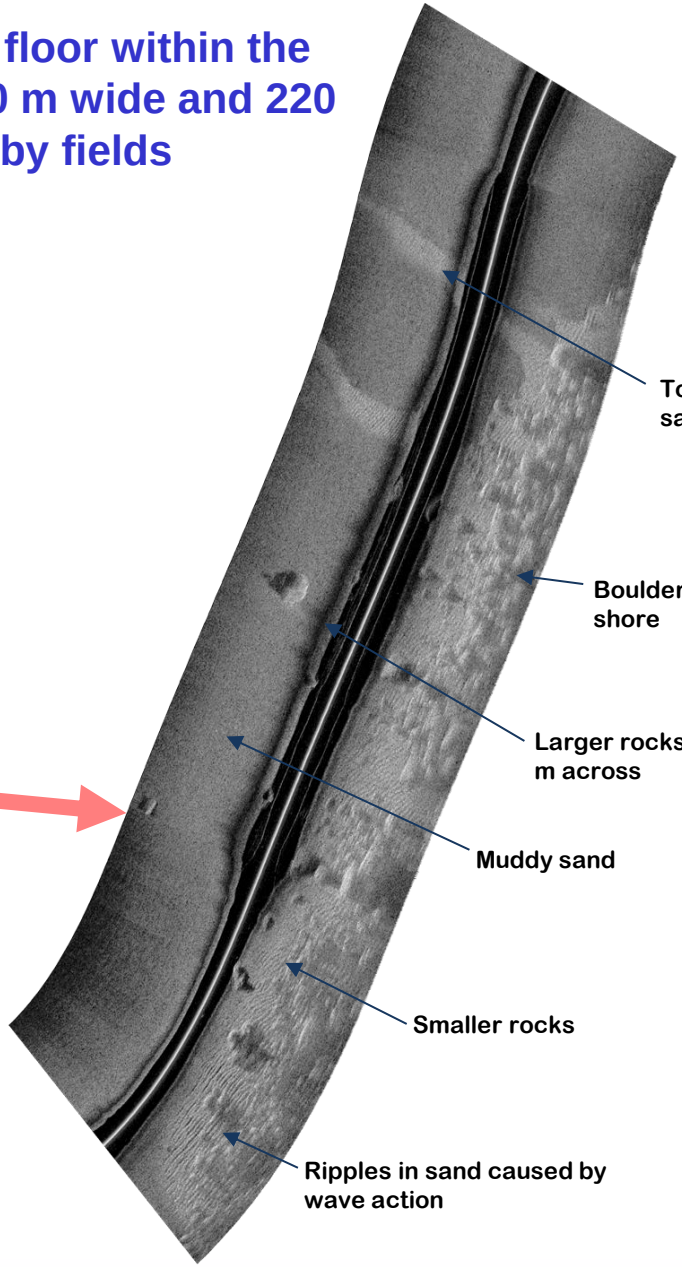
- One of the largest semi-sheltered bays in NZ
- Range of complementary/competing uses
  - Shipping
  - Commercial and recreational fishing
  - Marine farming
  - Sailing
  - Conservation
    - Two marine reserves
    - Separation Point
    - Abel Tasman National Park
    - Wakapuaka Taiapure



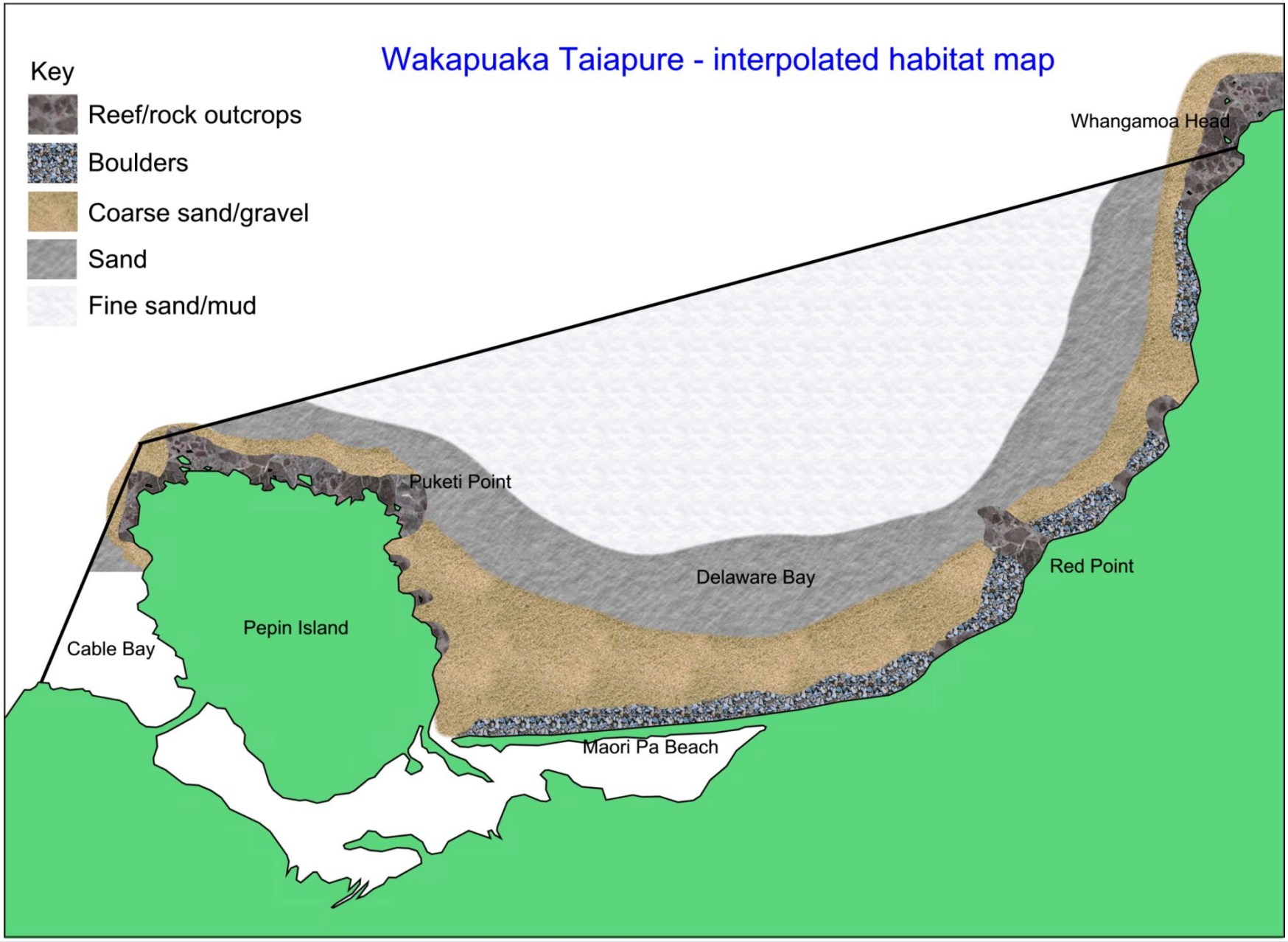
- Range of marine habitats
  - Sand and mud sea floor
  - Rocky reefs
  - Sandy beaches
  - Estuaries
  - Biogenic reefs
  - High current flow basins
  - The boulder bank

This image is a small portion of the sea floor within the Wakapuaka Taiapure, It covers an area 60 m wide and 220 m long, about the size of two rugby fields





Side-scan sonar images geo-referenced to show underwater reefs, Delaware Bay

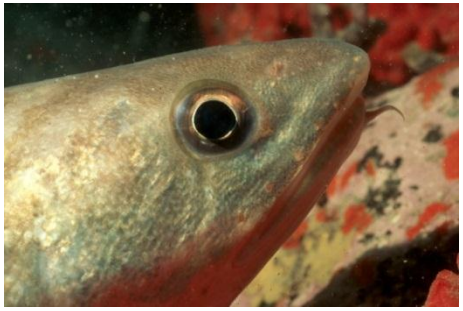

Wakapuaka Taiapure - interpolated habitat map
Key
Reef/rock outcrops
Boulders
Coarse sand/gravel
Sand
Fine sand/mud
Whangamoa Head
Puketi Point
Delaware Bay
Red Point
Pepin Island
Cable Bay
Maori Pa Beach

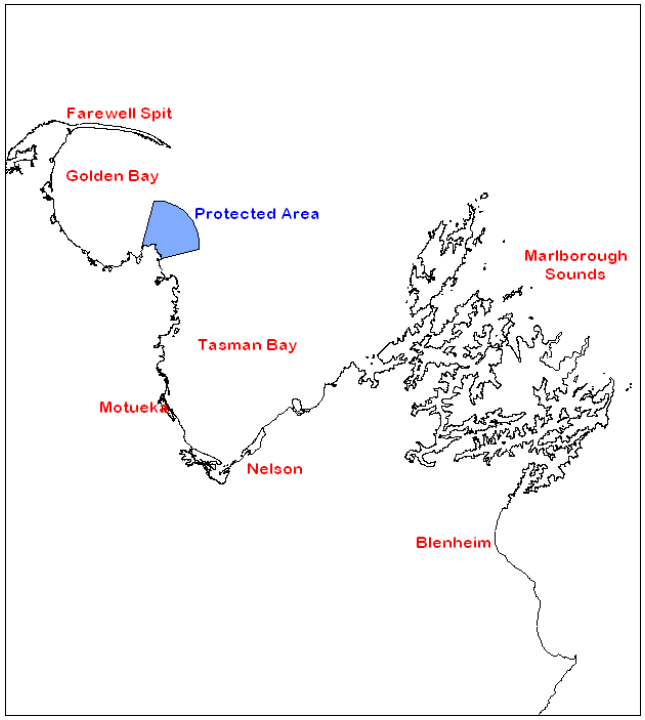


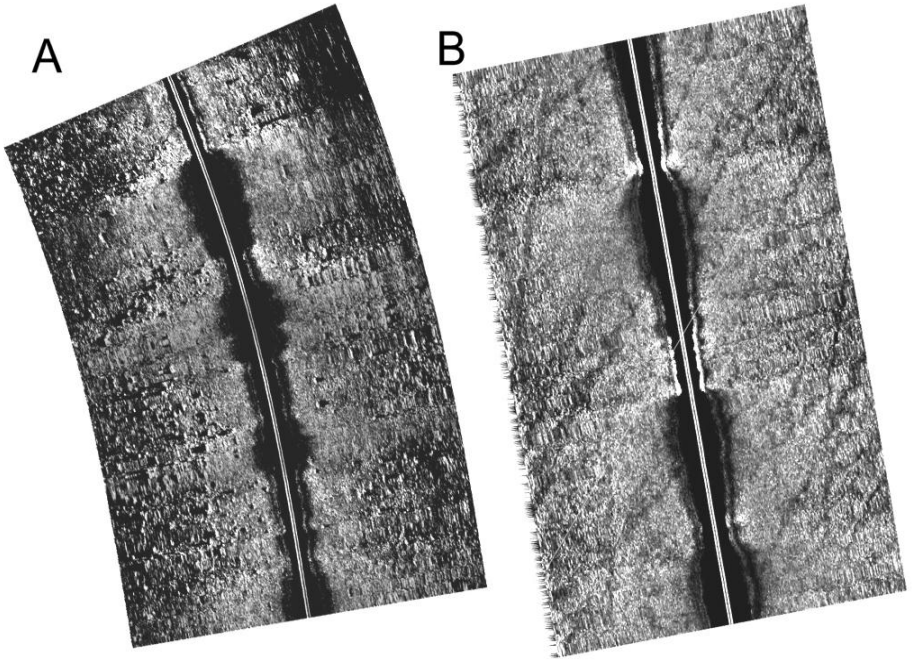








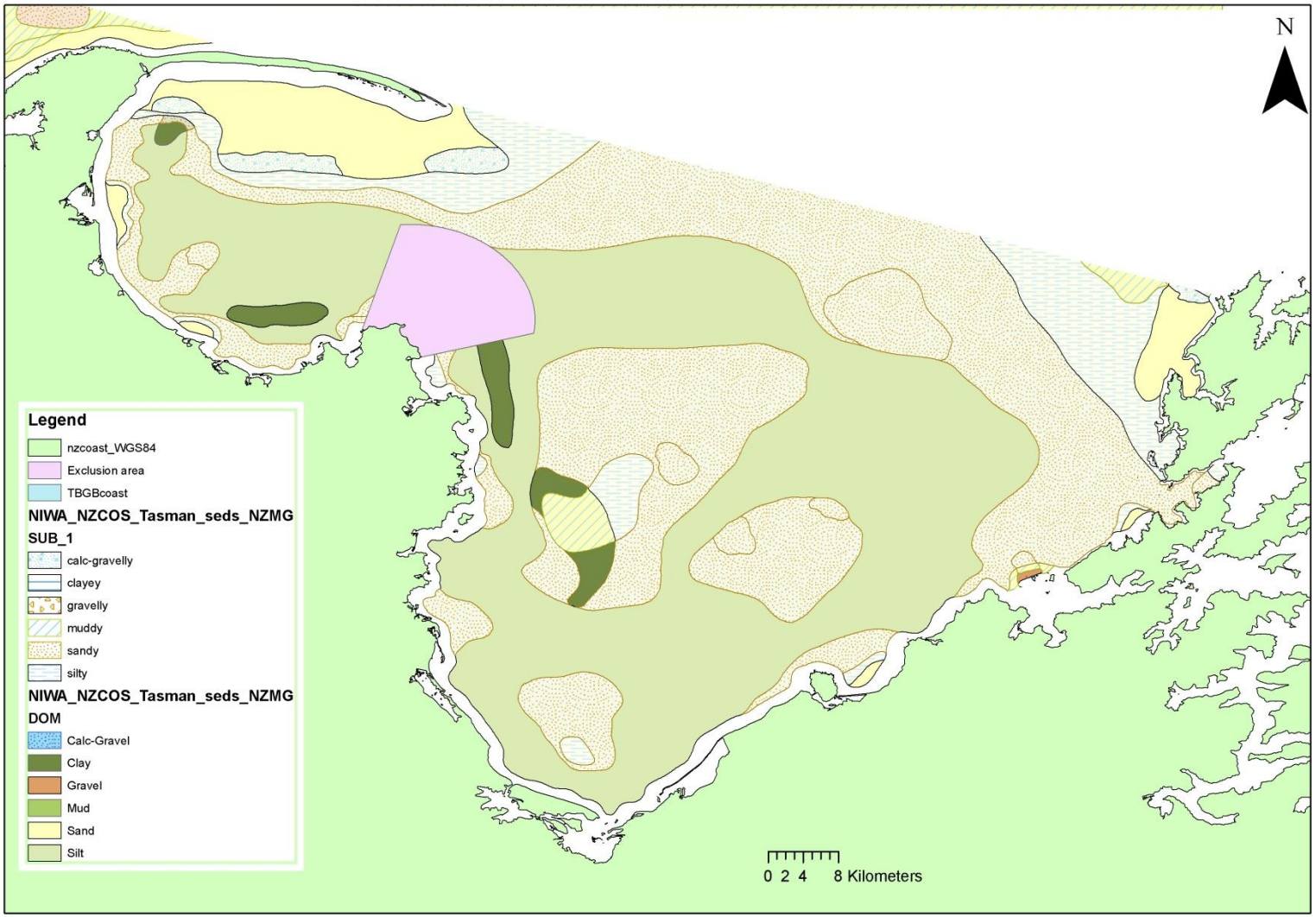


Farewell Spit
Golden Bay
Protected Area
Marlborough Sounds
Tasman Bay
Motueka
Nelson
Blenheim


A
B

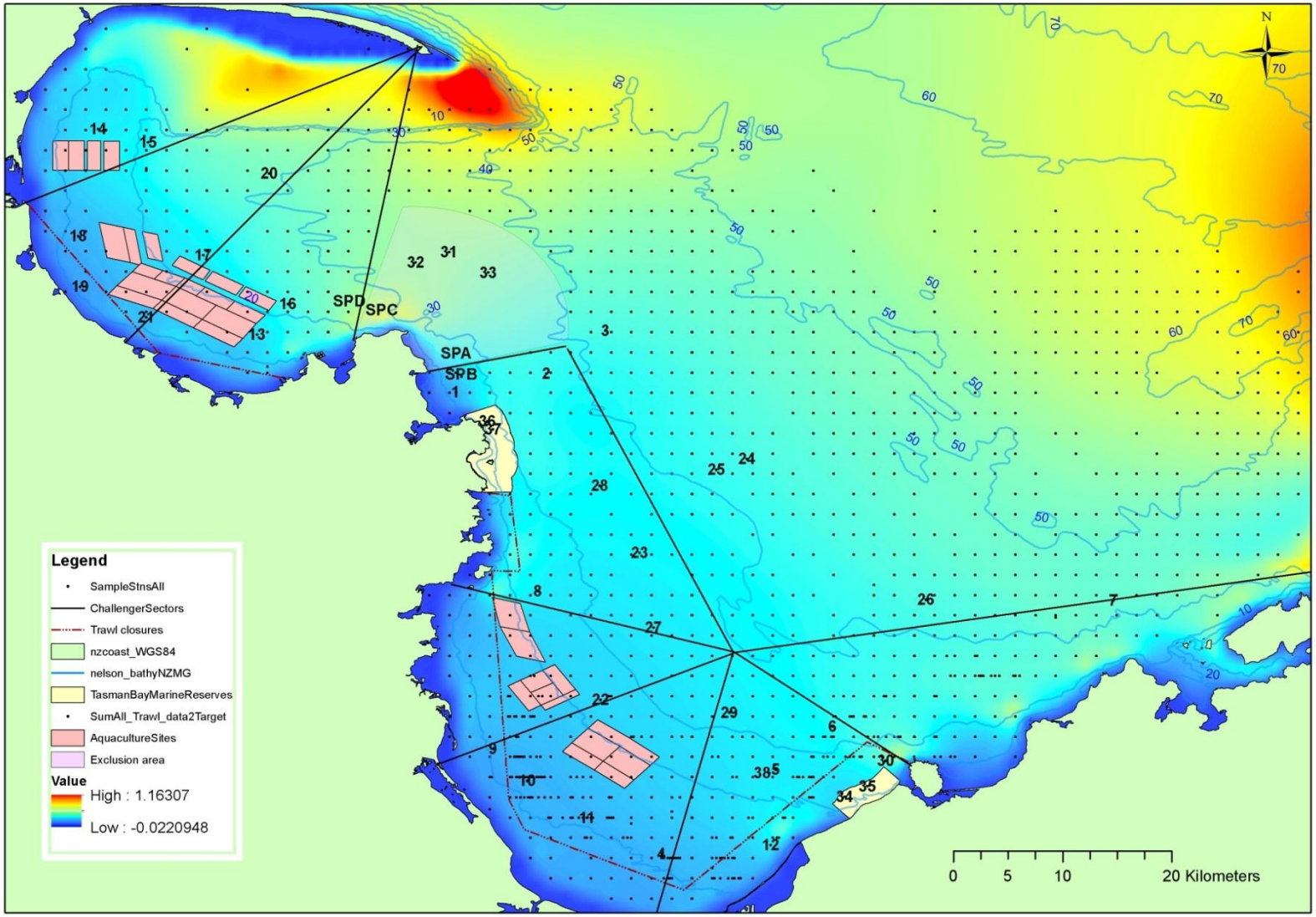
- Historically, Tasman Bay has been very productive
  - Significant dredge fisheries for mussels, oysters and scallops, worth >$100M per year at their peaks
  - Those wild fisheries have collapsed and there are a variety of opinions why, e.g
    - Land use – sedimentation, pollution, nutrient runoff
    - Over-fishing
    - Starvation during winter
    - Disease
    - Sea floor disturbance

How does the Bay work ecologically, and how can we tease out these factors?

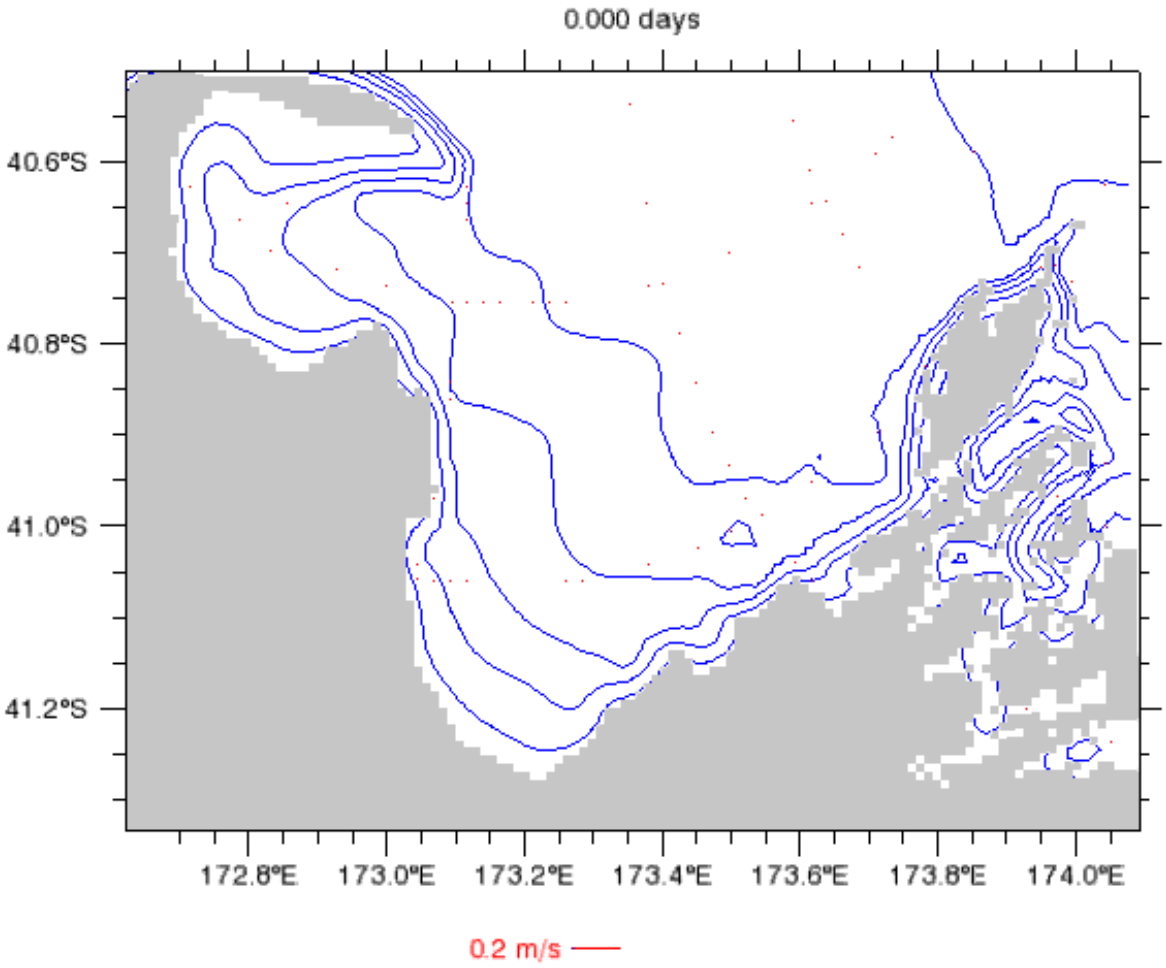
Sediments of Tasman-Golden Bay



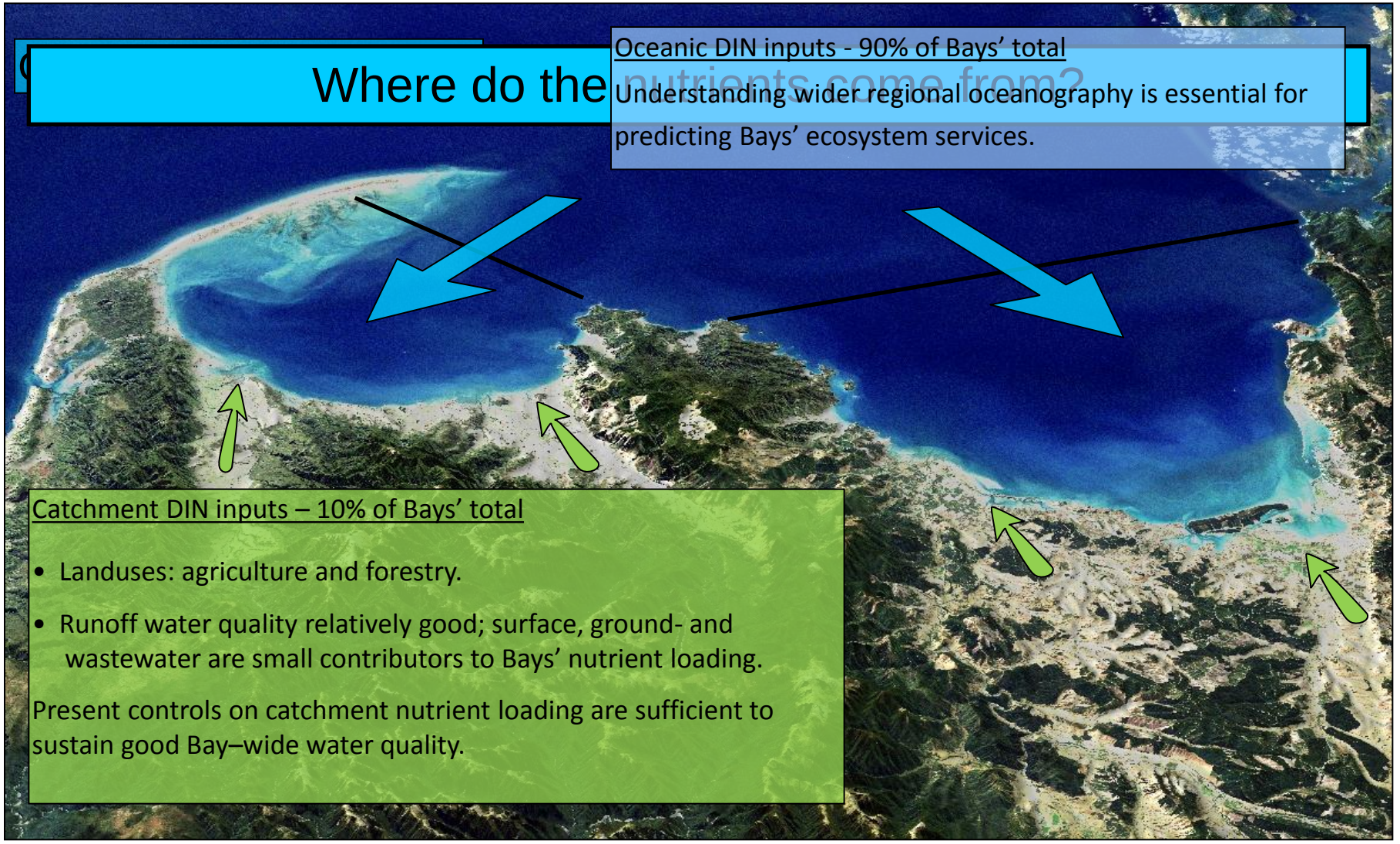
Mean current speed and depth, Tasman-Golden Bay



Tidal currents in Tasman-Golden Bay from a model with 1 km resolution



Where do the nutrients come from?



Oceanic DIN inputs - 90% of Bays' total

Understanding wider regional oceanography is essential for predicting Bays' ecosystem services.

Catchment DIN inputs – 10% of Bays' total

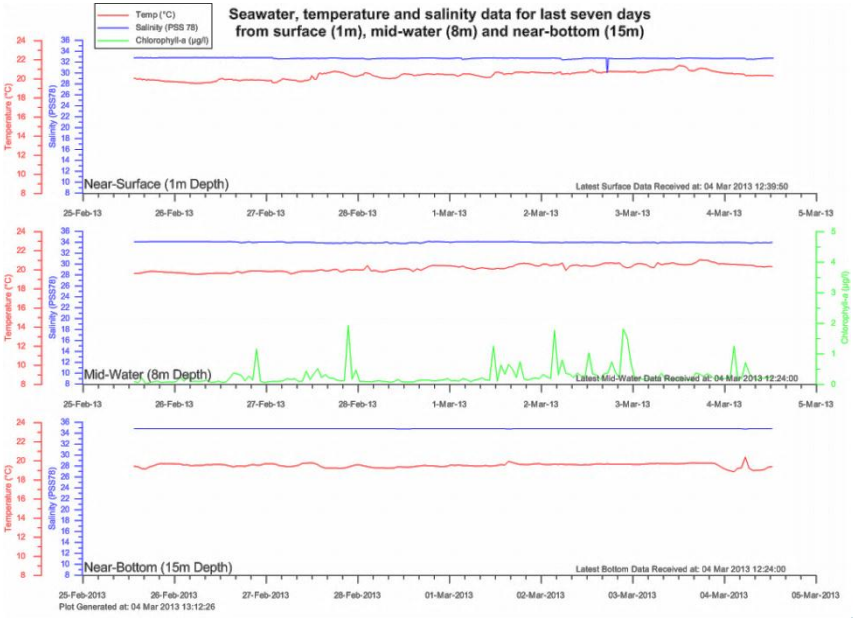
- Landuses: agriculture and forestry.
- Runoff water quality relatively good; surface, ground- and wastewater are small contributors to Bays' nutrient loading.

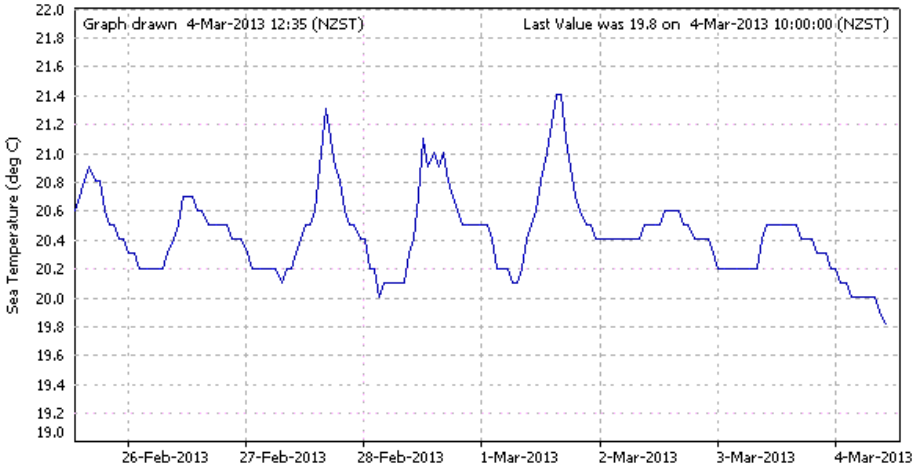
Present controls on catchment nutrient loading are sufficient to sustain good Bay–wide water quality.

Cawthron Tasman Bay buoy

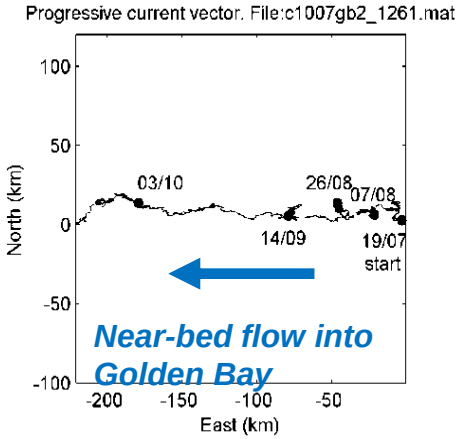
Real-time web-based data

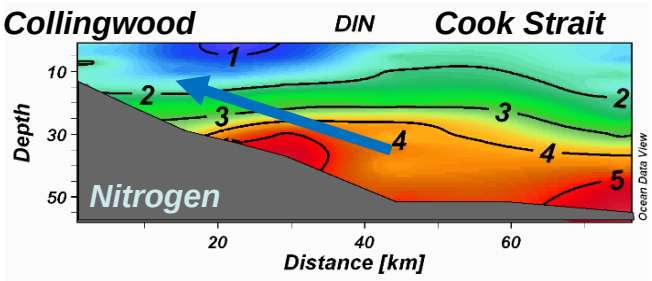
NIWA Golden Bay buoy

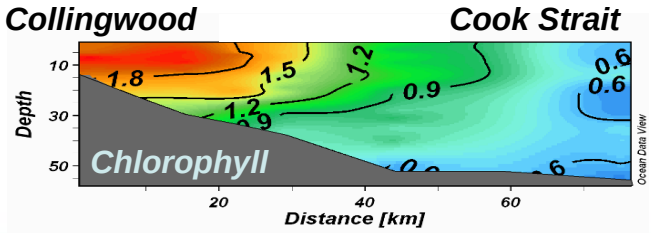




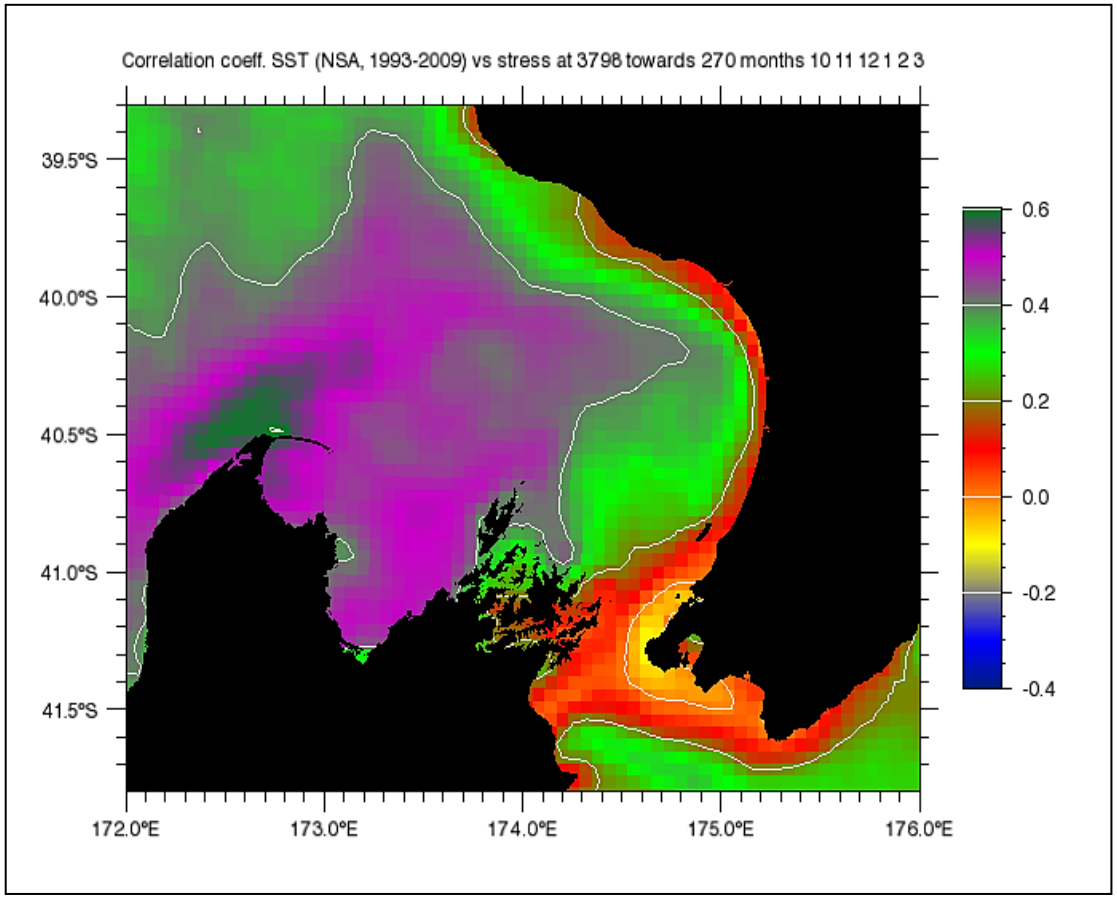
Bottom water flows in to the Bay causing the nutrients to rise into the light and increasing productivity.



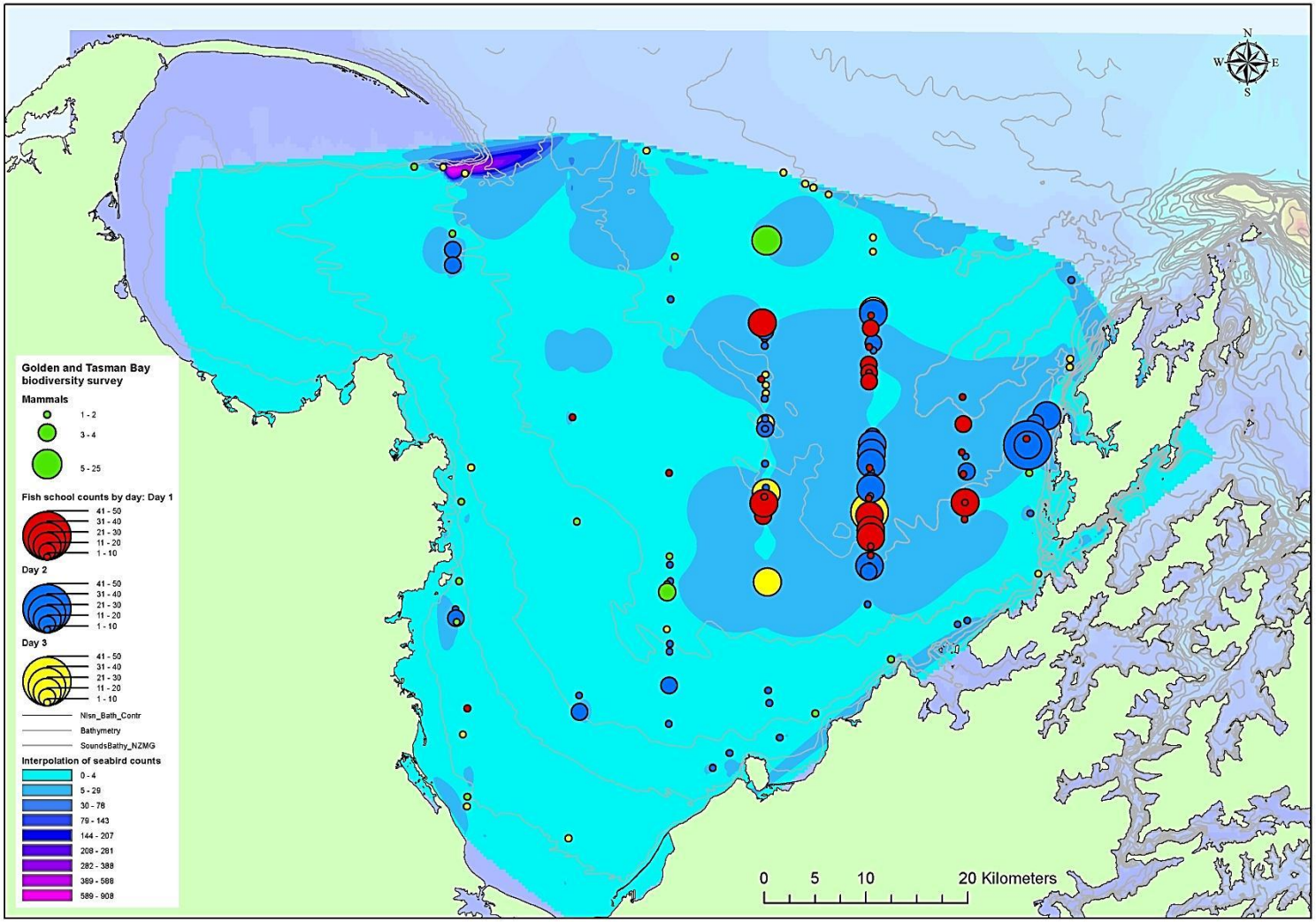




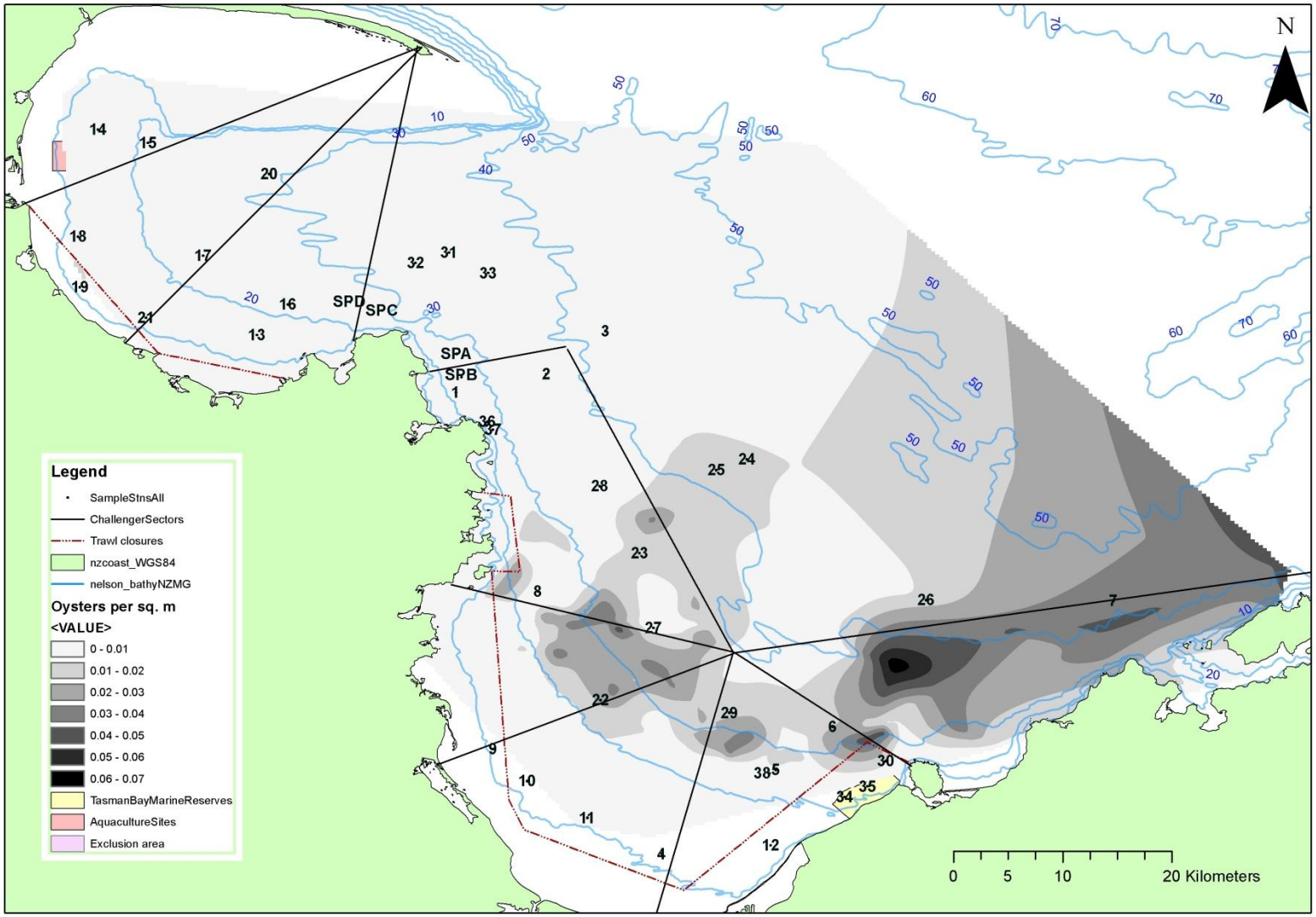
Sea Surface Temperatures and westerly winds. Upwelling affects Nelson Bays and is strongly correlated with ENSO.



Hotspots of marine mammals, sea birds, and bait fish schools, Tasman Bay



Oyster density and dredge effort



Oyster enhancement trials

NIWA trawl survey data over the last 20 years, Tasman Bay